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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/532,616	04/25/2005	Peter Edward James Abbott	JMYS-125US	4752
23122	7590	02/08/2008		
RATNERPRESTIA				
P O BOX 980				
VALLEY FORGE, PA 19482-0980				
EXAMINER				
NGUYEN, HUY TRAM				
ART UNIT		PAPER NUMBER		
1797				
MAIL DATE		DELIVERY MODE		
02/08/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary**Application No.**

10/532,616

Applicant(s)ABBOTT, PETER EDWARD
JAMES**Examiner**

Huy-Tram Nguyen

Art Unit

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

Applicant's arguments, see Applicant's remarks/arguments, filed on December 5, 2007, with respect to the rejection(s) of claim(s) 1-8 under 35 U.S.C. § 103 (a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of **Verachttert (US Patent No. 4,481,106), Carr (US Patent No. 5,169,516), Frey (US Patent No. 5,463,134) and Hayes (US Patent No. 3,839,192)** as described under rejections below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-3, and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Verachtert (US Patent No. 4,481,106) in view of Carr (US Patent No. 5,169,516) and Frey (US Patent No. 5,463,134)**

Regarding Claim 1, Verachtert reference discloses a process for the separation of a stream contaminated with alkyl mercaptans (**Column 1, Lines 20-23 and Figure 1, numeral 1**), comprising introducing sufficient oxygen into said stream to oxidise the mercaptans therein (**Column 2, Lines 58-67 and Column 4, Lines 7-10 and Figure 1, numeral 4 -air**) and subjecting the resultant mixture to a separation zone in a column including at least one bed of a catalyst capable, under the prevailing conditions, of oxidising mercaptans to higher boiling point sulphur compounds (**Column 1, Lines 65-68 and Column 4, Lines 1-4 – disulfides and Figure 1, numeral 5 - separation vessel and numeral 6, catalyst bed**).

However, Verachtert does not disclose that the feed stream contains propane and/or butanes from a natural gas liquid. Carr reference discloses a feed stream containing light liquid hydrocarbons in the C3-C5 range which contains mercaptan sulfur to be catalytically oxidized with air to convert mercaptans to disulfides. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the light liquid hydrocarbons as taught by Carr since it was known in the art to convert a "sour" natural gas into a "sweet" product using a catalytic oxidation process.

Also, Verachtert does not disclose that the separation zone is a catalyst fractional distillation. Frey reference discloses a catalytic distillation column for removing the contaminants such as mercaptans, oxygenates and olefins (Abstract and Column 1,

Lines 31-36). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the catalytic distillation column of Frey in place of the separation zone of Verachtert to reduce the size and complexity of the equipment needed and reduce the capital cost for removing the levels of mercaptans and olefinic hydrocarbons in the hydrocarbon stream **(Frey – Column 2, Lines 15-21)**.

Furthermore, Verachtert reference does not specify a temperature and a pressure range. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the claimed pressure and temperature range for the claimed distillation, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding Claim 2, Verachtert, Frey, and Carr references disclose the process according to claim 1 wherein the catalyst comprises a granular material containing a transition metal on a support **(Verachtert - Column 6, Lines 36-40)**.

Regarding Claim 3, Verachtert, Frey, and Carr references disclose the process according to claim 2 wherein the transition metal comprises copper, manganese or cobalt or a mixture of two or more of these **(Verachtert - Column 6, Lines 52-55 – manganese, and cobalt)**.

Regarding Claim 5, Verachtert, Frey, and Carr references disclose the process according to claim 1 wherein the amount of mercaptans presents in the natural gas liquid is less than 2000 ppm volume **(Carr - Column 12, Lines 28-31)**.

Regarding Claim 6, Verachtert, Frey, and Carr references disclose the process according to claim 1 except for the distillation is effected at a pressure in the range of 5 to 25 bar abs. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the claimed pressure, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding Claim 7, Verachtert, Frey, and Carr references disclose the process according to claim 1 wherein the oxygen is supplied by dissolving air in the natural gas liquid (**Verachtert – Column 2, Lines 58-61**).

Regarding Claim 8, Verachtert, Frey, and Carr references disclose the process according to claim 1 wherein water is incorporated into the natural gas liquid in such an amount that it is miscible with the natural gas liquid under the prevailing conditions (**Verachtert – Column 2, Lines 54-58 –an aqueous alkaline solution**).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Verachtert (US Patent No. 4,481,106) in view of Carr (US Patent No. 5,169,516), Frey (US Patent No. 5,463,134), and Hayes (US Patent No. 3,839,192)**.

Regarding Claim 4, Verachtert, Frey and Carr reference discloses the process according to claim 3 except for the granular material comprising copper sulphates, sodium chloride and water on a clay support. Hayes reference discloses catalyst composites comprising transition metal sulfates, sodium chloride and water (**Column 1, Line 40 – transition metals, Column 5, Line 14 – clay support, Column 6, Line 50 –**

Sodium Chloride and Column 9, 25 – water). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the catalyst prepared by Hayes since it was known in the art that such composites could be used as a catalyst in many industries such as petroleum and petrochemical industry for hydrogenation-dehydrogenation processes and cracking processes.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Huy-Tram Nguyen whose telephone number is 571-270-3167. The examiner can normally be reached on MON- THURS: 6:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HTN
1/28/08

/Walter D. Griffin/
Supervisory Patent Examiner, Art Unit 1797